In addition to these forms which considerable field study of their habit and surroundings have shown to be unmistakably of hybrid origin and in which, for the most part, it has been easy to determine from what species they have been derived, there are many uncertain forms in need of further study. Among them may be noted what seems to be a triple hybrid between *Viola* (*fimbriatula* × *papilionacea*) and *Viola emarginata*, at Takoma Park, July 23, 1904 (No. 95).

CLEMSON COLLEGE, South Carolina.

EXPLANATION OF PLATES.

PLATE 71. *Viola Brittoniana* × *emarginata* House. (Natural size.) *a*. Flowering plant. *b*. Mature leaf. *c*. Cleistogamous flowers. *d*, *e*. Capsules from cleistogamous flowers.

PLATE 72. *Viola Stoneana* × *villosa* House. (Natural size.) *a*. Flowering plant. *b*. Mature plant. *c*. Cleistogamous flower. *d*. Capsule from cleistogamous flower.

NOTES ON ALGAE,— VII.

F. S. COLLINS.

IN this number of the Notes are included records of various species, etc., new to our flora; also a few items of interest in regard to previously recorded species; unless otherwise indicated, all were collected by the writer.

PHORMIDIUM RETZII (Ag.) Gomont forma FASCICULATUM (Bréb.) Gomont, Monogr. des Oscill., p. 197. The typical *P. Retzii* is a widely distributed species, and is common in sluggish waters throughout New England, in the form of rather firm coatings, from one half to one cm. thick, on stones and other objects. When the current is rather brisk, these coatings sometimes fringe out into narrow strings, but the extreme form appears to be unusual. It was found by the writer in quite rapid water, in Lynnfield, Mass., June 11, 1905. There was a distinct stipe-like part, flattened, expanding above into a broader lamina, repeatedly dividing, and ending in innumerable long, slender,

pointed, free or entangled strings, waving actively in the current. The stipe was dark brown, the lamina and its divisions were intense blue-green; sometimes such a frond had a length of 60 cm., and a very curious resemblance in habit to one of the digitate Laminarias. It was distributed in Collins, Holden & Setchell, Phycotheca Boreali-Americana, No. 1254.

LYNGBYA AESTUARII (Mert.) Liebmann and L. SEMIPLENA (Ag.) J. Ag., are found as marine algae the world over, except in arctic and antarctic regions; the former has been found occasionally in fresh water in Europe, but apparently not in this country; both grew abundantly in an old claypit at West Cambridge, Mass., Aug. 6, 1905. *L. aestuarii* from this locality has been distributed as P. B.–A., No. 1255.

CALOTHRIX STAGNALIS Gomont, Journal de Botanique, Vol. IX, p. 197. Forming stellate tufts on various filamentous algae in standing water, Medford, Mass., in August, 1903. It is one of the few distinctly epiphytic species of the genus; the filaments, seldom exceeding a millimeter in length, are 8–10 μ in diameter at the middle, tapering to a fine hair above, somewhat thickened at the decumbent base. The sheath is thin and transparent, the trichome aeruginous, distinctly torulose, with cells about as long as broad. There are two basal heterocysts, yellowish, spherical or subquadrate, and above them, in the mature plant, a sub-cylindrical spore, 12–14 μ diameter, 2–4 diameters long; rarely two spores occur. Spores have been reported as produced under culture in a marine species of Calothrix, but *C. stagnalis* was the first in which spores were found under normal conditions. Apparently the only record up to the finding of the American locality, as above, is that for the original station near Angers, France. Distributed as P. B.–A., No. 1114.

ENDODERMA VIRIDIS (Reinke) Lagerheim, Öfversigt Vet. Akad. Forhandl., p. 74, 1883. The only species of *Endoderma* hitherto known in America is *E. Wittrockii* (Wille) Lagerh., which is not uncommon in various brown algae on the New England coast. In September, 1883, the writer collected at Falmouth, Mass., a specimen of *Seirospora Griffithsiana* Harv., and on examining it under the microscope found in the older parts a green endophyte which he could not identify at the moment, and a memorandum was made to look it up when convenient. It was not until the present year that the matter was again taken up; and it was found that the plant agrees with description and figures of *E. viridis*. The filaments are more slender

than those of *E. Wittrockii*, averaging 6 μ diameter; the branching is more abundant and irregular; the cells vary from one to six diameters long, and are quite irregular in form, not nearly cylindrical, as in *E. Wittrockii*. A good figure will be found with the original description as *Entocladia viridis* Reinke, in Bot. Zeit., p. 476, Pl. VI, 1879. In Europe it has more southern range than *E. Wittrockii*.

ACROCHAETE REPENS Pringsheim, Abh. Königl. Akad. Wiss., Berlin, p. 4, Pl. II, 1862. In this paper on the morphology of marine algae, Pringsheim published two nearly related genera of green algae, *Acrochaete* and *Bolbocoleon*, both growing in the tissue of brown algae, at the island of Helgoland. In each there is a more or less branched filament, creeping among the cortical cells of the host, and bearing very long and slender bristles, which project beyond the surface of the host; but the character of the bristles is different in the two. In *Acrochaete* they arise each from the terminal cell of a short lateral branch; in *Bolbocoleon* the hair projects from a specialized nearly empty cell; this is partitioned off from the vegetative cells, and has a relatively large bulbous base to the long sheath. *Bolbocoleon piliferum*, the original and only species, has been found to have quite a wide distribution, but *Acrochaete repens* seemed to be limited to a small district in northern Europe. It was therefore interesting to find it occurring in considerable abundance at Wood's Hole, Mass., Sept. 1, 1905, in fronds of *Chorda Filum* (L.) Stack., the host plant of the original station. Distributed as P. B.–A., No. 1279.

BRYOPSIS HYPNOIDES Lamouroux, Journal de Botanique, p. 135, 1809. While there have been occasional reports of the occurrence of this species on the New England coast, the writer has failed to obtain specimens confirming them, and it has seemed probable that all should be referred to *B. plumosa* (Huds.) Ag. A specimen from the herbarium of Capt. N. Pike, marked *B. hypnoides*, is evidently *B. plumosa*. Recently Mr. J. A. Cushman submitted to the writer a small collection of algae from Horseneck Beach, near New Bedford, and in this collection was a single specimen agreeing perfectly with European specimens of *B. hypnoides*. This was of course enough to give the species a place in our lists; and in May, 1905, it was found washed ashore at Mattapoisett, Mass., in sufficient quantity for it to be distributed as P. B.–A., No. 1286. Unfortunately some plants varied considerably from the type in the direction of *B. plumosa*. In *B. hypnoides* the branches of successive orders decrease gradually in size, those of each order being arranged spirally about their axis; in

B. plumosa the ramuli are bifarious and plumose, the distinction between branches of successive orders being quite marked. We certainly have both types; more investigation will be needed to make sure where specific lines should be drawn. Indeed, all the species of *Bryopsis* are vague in their limitations.

STREBLONEMA PARASITICUM (Sauv.) De Toni, Syll. Alg., Vol. III, p. 575; *Ectocarpus parasiticus* Sauvageau, Journal de Botanique, Vol. VI, p. 82, Pl. III. A very small plant with irregular basal filaments penetrating the tissue of the host and sending out short, simple filaments with cells 6–8 μ diameter and about one and a half diameters long; also slender hairs and subcylindrical, mostly biseriate, plurilocular sporangia. In Europe this species occurs in *Cystoclonium purpurascens* (Huds.) Kütz., *Gracilaria compressa* (Ag.) Grev., and *Ceramium rubrum* (Huds.) Ag. It has been found here only in *Cystoclonium purpurascens*, in the main stems and larger branches of well grown plants; where the endophyte is abundant the natural red color is changed to a dull yellow. It has been collected at Harpswell, Maine, and at Wood's Hole, Mass.; probably it occurs wherever the host plant is found.

STREBLONEMA OLIGOSPORUM Strømfelt, Om Algvegetationen i Finlands sydvestra Skärgård, p. 133, Pl. I, fig. 5. Another minute endophytic plant, with a basal layer of somewhat contorted, freely branching filaments, composed of rather irregular cells usually 10 μ long, 5–10 μ diameter; from these arise simple, cylindrical branches, about 5 μ diameter, ending in colorless, articulate hairs, which project beyond the surface of the host; also uniseriate plurilocular sporangia, usually cylindrical, 25–40 by 8–15 μ, occasionally shorter and ovate-lanceolate in outline. This species was first found in Iceland, where it occurred in the tissue of *Coilonema Chordaria* Aresch.; a plant found at Bailey's island, Casco Bay, Maine, appears to be identical, although occurring in a different host, in this case, *Gloiosiphonia capillaris* (Huds.) Carm. While resembling the preceding species, it seems to be distinct; in *S. parasiticum* the basal filament bears, in addition to the hairs, short vegetative filaments and sporangia of about the same height; in *S. oligosporum* the hairs are borne at the ends of the branches, which are fewer in number and much longer than the sporangia.

ASPEROCOCCUS ECHINATUS (Mert.) Grev. var. VERMICULARIS (Griff.) Harvey, Manual of the British Algae, p. 35. In place of the rather coarse, pipe-stem-like fronds of the type, the fronds in this

variety are hardly more than setaceous; up to 40 cm. long, with a diameter of about one millimeter; the sori show a tendency to an arrangement in rings about the frond. Found in a tide pool at Cedar Ledge, Casco Bay, Maine, July 15, 1904.

Malden, Massachusetts.

SOME NEW OR LITTLE KNOWN CYPERACEAE OF EASTERN NORTH AMERICA.

M. L. Fernald.

Recent studies in various genera of *Cyperaceae* in the eastern United States and adjacent Canada have made it necessary to recognize a number of undescribed species and varieties in our flora and to alter the current interpretation of some others. These items which have been accumulating for some years are here brought together as a series of notes arranged in the sequence of the genera and species as now understood by the writer.

Cyperus dentatus Torr. Fl. 61 (1824) was based upon *C. parviflorus* Muhl. Gram. 19 (1817), not Vahl. To the characterization of Muhlenberg's plant with the "Habitat ad ripas Susquehannae.... etiam in N. Anglia",[1] and with "Spiculis 3 compressis alternis ovatis, 8-floris," [2] Torrey added "Spikes....appearing dentate or pectinate by the spreading of the points of the glumes when old";[3] thus indicating very clearly a plant which occurs on sandy shores from central Maine to western New York and southward at least to West Virginia. This characteristic plant with prominent scale-tips varies in the number of flowers from 5 to 13, and the spikelets are very often altered to leafy tufts. An extreme development of the plant which is more common in certain portions of southern New England than typical *C. dentatus* may be distinguished as

C. dentatus, var. **ctenostachys**, n. var. Spikelets 15–40-flowered, the scale-tips less prominent.— Massachusetts, West Pond, Plymouth, September 23, 1863 — type, September 13, 1853 (*Wm. Boott*); Middleborough Pond, September 9, 1870 (*Wm. Boott*); margin of

[1], [2], Muhl. Gram. 19 (1817). [3] Torr. Fl. 61 (1824).